Hydrolytic Enzymes – New Comprehensive Biochemistry, vol. 16; Edited by A. Neuberger and K. Brocklehurst; Elsevier, Amsterdam, 1987; xii + 423 pages. $126.25, Dfl.240.00

This volume is a collection of 8 chapters from individual authors, each an acknowledged expert in the respective subject area. Six of the contributions are concerned with aspects of proteolysis (aspartic, cysteine and serine proteinases; a representative of the metalloproteinase family (carboxypeptidase); proteinase inhibitors; and intracellular proteolysis) while the final two examine pancreatic ribonuclease and phosphomonoesterases, respectively. It is not at all obvious where this volume will have its appeal since, unfortunately, it is a perfect illustration of the old adage that books are 'out of date' before they appear.

It was received for review in May 1989 but with an apparent publication date of 1987. The preface written by the editors is dated December 1987. Even this is not the end of the time warp, however. The first (admirable) chapter on aspartic proteinases (by J.S. Fruton) gives no indication of the explosion of interest that has occurred in this field within the last five years. However, when the (lengthy) list of references contains no entry later than 1984, the realisation begins to dawn that this contribution was probably written a long time ago. Sympathy for the plight of the contributing authors becomes wholehearted upon discovery at the end of another (excellent historical) review on intracellular proteolysis (by P. Bohley) that his chapter was indeed originally submitted in May 1985. The frustration becomes clear with an addendum which indicates that since then this field has (also) developed rapidly and a few more recent relevant reviews and seminal papers are appended. The existence of these clearly obviates the need to invest in the present volume which at $126 will, I suspect, be acquired only by those who wish to maintain continuity of the series on their shelf. It is unlikely to come down off it very frequently.

John Kay

Mechanistic Principles of Enzyme Activity; Edited by J.F. Liebman and A. Greenberg; VCH Publishers, New York and Weinheim, 1988; xii + 404 pages; £69.00

This volume is not a Symposium report, but one of a series of specially commissioned sets of reviews on the general topic of molecular structure and genetics. The nine reviews in this volume are of two kinds: those on techniques or theories of interpretation (stereoelectronic analysis (S.A. Benner), intramolecularity (A.W. Czarnik)), and those which review particular classes of enzymes, such as zinc proteases (D.W. Christianson and W.N. Lipscomb), iron protoporphyrin and flavin mixed function oxidases (both by T.C. Bruice), electron transfer in some cytochromes (D.W. Dixon), porphyrin metalation (D.K. Lavallee) and GSH-dependent aldehyde oxidation (D.J. Creighton and T. Pourmotabbed)). R.W. Schowen's essay on Charge-relay Catalysis in Serine Proteases falls into both these classes.

The first thing that must be said is that the level of discussion is very variable. The discussion of electron transfer in cytochromes C and B5 is at times so high-level as to be only comprehensible by specialists; on the other hand, a good deal of the review of porphyrin metalation is devoted to reviewing physiological evidence for the existence of a ferrochelatase. This is very interesting, but not very relevant to mechanistic principles. One gains the impression that in some instances the material available for review was not really sufficient to justify a chapter. For example, at one point we are told three times in four pages that cells are exposed to formaldehyde from the environment. As the book is so expensive, this is not a trivial complaint. The syntax is not always very good, either; the editors could have done more to earn their bread.

However, there are some good things in the book. The best is the very lucid and perceptive review by Schowen, which goes to the heart of the problem of justifiable inference from the results of (often very sophisticated) experiments. Schowen points out that entities isolatable in crystalline form or in high concentration in solution are likely to be highly stable, and cannot be good simulators of the quintessentially unstable transition state. "In the most fundamental sense, such studies are therefore *irrelevant to an understanding of transition-state interactions or events in catalysis*" (author's italics).

These sentiments make it easier to understand why fine-detail crystallography and site-directed mutagenesis

(for example) have been less helpful than was confidently expected even a few years ago. This book leaves the impression that in many instances another thirty years of research (grants permitting) will be needed to come to a comprehensive conclusion about mechanisms. In a sense this is because the goalposts have been moved. Back in the 1920s, a major aim of mechanistic studies was to show that mechanisms were basically similar to those being elaborated by organic chemists, and therefore not due to 'vital force'. Later, residues making up the 'active centre' were identified. Now it is felt necessary to take account of changes of conformation of the whole enzyme during catalysis.

One can put this in another way. If an applied aim of this kind of research were to show how one could construct, in each case, a man-made enzyme which would be at least as efficient as the natural entity, and if it turned out that the only way to do this would be to construct a protein of equal complexity, the aim of the research would begin to look remarkably silly.

J.H. Ottaway

New Protein Techniques – Methods in Molecular Biology, vol. 3; Edited by J.M. Walker; Humana Press, Clifton, NJ, 1988; xv + 531 pages; £41.00

New Protein Techniques is volume 3 in this series, edited by John Walker, of which volume 1, published in 1984, was entitled simply Proteins (volumes 2 and 4 cover nucleic acids). The title could be somewhat misleading since one might assume that the 'new' techniques described had been developed in the intervening period. Although true for some of the methods, this book is not designed to supersede volume 1 but rather to extend the range of the series. Thus the emphasis is not on state-of-the-art methods but on procedures in regular use in the laboratory of each contributor, giving all the details necessary to achieve success at the first attempt.

In general, each chapter deals with one specific method, such as 'The Bradford Method for Protein Quantitation' (chapter 2) but occasionally several procedures are described under a composite heading. Thus in chapter 7, 'Chemical Modification of Proteins', four methods commonly used prior to sequence analysis are presented. The editor has devised a useful standard format for each chapter comprising: 1. Introduction, usually just a couple of pages; 2. Materials, including suppliers of non-standard chemicals; 3. Method, listing experimental details in numbered steps; 4. Notes, perhaps the most informative section of all, in which tricks of the trade are disclosed and the best ways of avoiding common pitfalls are set out. As an illustration of the content of this section, in chapter 5, 'Enzymatic Methods for Cleaving Proteins', 3 of the 16 notes concern the requirement for Ca^{2+} to prevent autolysis in buffers used for tryptic digests, the need to employ conditions that will denature substrate but not enzyme, and the advantages of procuring commercially available grades of trypsin that have been treated with chymotrypsin inhibitors. Such tips are of enormous benefit to potential users and can only be provided by experienced practitioners. In this respect the large number of contributors is a major advantage. At the end of each chapter a list of references is provided, although, given the detail of the experimental section, these would not normally have to be consulted.

Just under half of the 38 chapters deal with methods for separating proteins by electrophoresis in gels or for detecting them thereafter. In other chapters, methods for various modes of chromatography, protein cleavage, amino acid analysis, peptide synthesis, production of antisera, enzyme immobilization and a handful of other assorted techniques are described.

Currently, several books are available on methods in protein chemistry. Confusingly, J.M. Walker is also joint editor of two volumes in a series called 'Techniques in Molecular Biology' published by Croom Helm. However, most of the methods in these books relate to nucleic acids rather than to proteins and in any case the approach is less practical. A. Darbre's book 'Practical Protein Chemistry: A Handbook' (1986) provides stiff competition, as do several volumes in the 'Practical Approach' series published by IRL Press, including two recent additions 'Protein Structure' and 'Protein Function' both edited by T.E. Creighton. No doubt, since they have slightly different slants, all these books will find a place in laboratories where proteins are studied. A minor criticism is that to provide clarity it is not necessary to print the text in characters legible at the other end of the bench, so that the book could probably have been reduced in size by about a third. Nevertheless the strength of this book lies in an easy clarity derived from firm editorial policy and concentration on detailed practical directions together with the insight provided in the admirable Notes.

G.B. Irvine